

REMARKS

Claims 1, 4-14 and 16-19 are pending in the application. Claim 13 has been amended herein. Favorable reconsideration of the application, as amended, is respectfully requested.

Claim 13 has been amended to address the Examiner's objection.

I. REJECTION OF CLAIMS 1, 4-14 AND 16-19 UNDER 35 USC §103(a)

Claims 1, 4-14 and 16-19 now stand rejected under 35 USC §103(a) based on *Goto et al.* in view of *Sirbu et al.* Applicants respectfully traverse the rejection for at least the following reasons.

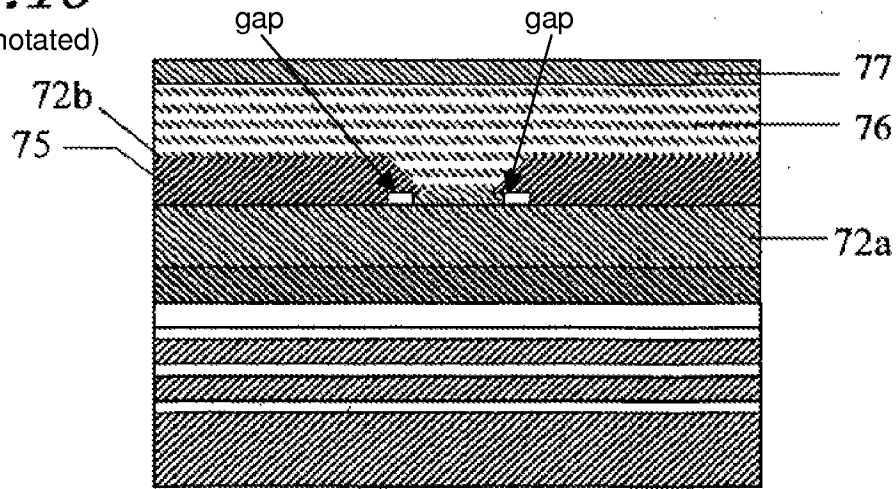
Applicants previously argued that *Goto et al.* does not teach or suggest gaps between the overhanging portions of the current blocking layer and cladding layer which are not filled by the third Group III-V compound semiconductor as recited in claims 1 and 12.

In response, the Examiner acknowledges that *Goto et al.* does not specify that the gap is unfilled by the third Group III-V compound semiconductor. However, the Examiner points to *Sirbu et al.* as teaching that air gaps are desirable in order to restrict current flow. (See, e.g., O.A., p. 3, last paragraph). The Examiner argues that it would have been obvious to one having ordinary skill in the art to modify the device described in *Goto et al.* in order to include air gaps as taught in *Sirbu et al.* so as to result in the claimed invention.

Applicants respectfully submit that the combination proposed by the Examiner would not have been obvious. There is no teaching or suggestion as to how or why the structure described in *Sirbu et al.* could be combined with the structure of *Goto et al.* yet still result in the claimed invention.

FIG. 10

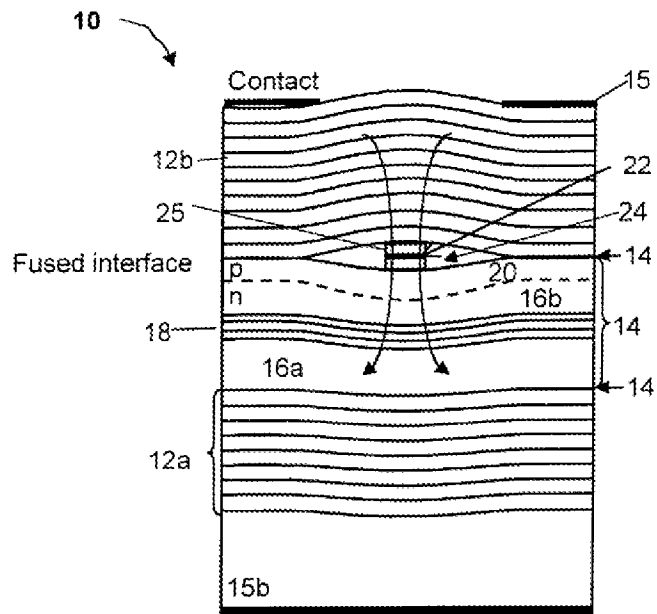
(Annotated)



Present Invention

As exemplified in Fig. 10 of the present application (reproduced above), each gap according to claims 1 and 12 is formed between the overhanging portion of the current confining layer (75) and a part of the surface of the Group III-V compound semiconductor (72a).

Referring to Fig. 1A of *Sirbu et al.* (reproduced at right), the reference admittedly teaches the formation of air gaps 24 on adjacent sides of a mesa 22 between an upper spacer 16b and DBR 12b. However, it is important to note that *Sirbu et al.* describes providing such air gaps 24 by virtue of fusing the



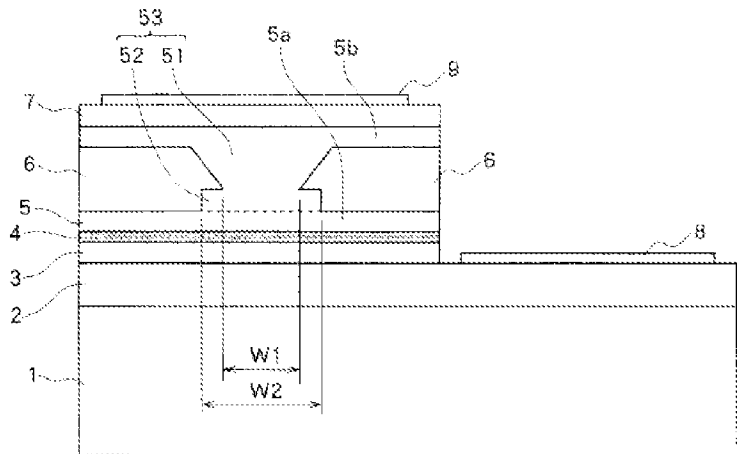
Sirbu et al. Fig. 1A.

DBR layer to the active cavity material with the mesa 22 located therebetween and applying a pressure at elevated temperature. This results in the somewhat deformed sandwich configuration described in *Sirbu et al.* that produces the air gaps 24. (See, e.g., Col. 7, Ins. 54-66). As illustrated above, applicants describe how air gaps are formed between overhanging portions of the current confining layer and part of the surface of the first Group III-V compound semiconductor.

Sirbu et al. teaches forming the air gaps 24 by virtue of the insertion of a mesa 22 and thereby deforming the layers of the sandwich to produce the air gaps. *Sirbu et al.* does not teach or suggest how such techniques for forming air gaps may be utilized in order to form air gaps under overhanging portions of the current confining layer in accordance with the present invention.

Goto et al. admittedly teaches the aspects of overhanging portion as shown in Fig. 6 (reproduced at right). As previously argued, however, *Goto et al.* does not teach or suggest how one may form gaps under the overhanging portions that are not filled by the third Group III-V compound semiconductor as claimed.

FIG. 6



Neither *Goto et al.* nor *Sirbu et al.* teaches or suggests how one of ordinary skill in the art might combine the air gap aspects of *Sirbu et al.* with the overhanging portions aspect of *Goto et al.* so as to produce a device which includes gaps beneath the

overhanging portion not filled by the third Group III-V compound semiconductor.

Neither of the references teaches or suggests how the sandwiched approach of Sirbu et al. could be combined with the overhanging approach of Goto et al. yet still provide for the formation of the Group III-V compound semiconductor within the striped opening as recited in the claimed invention.

The process described in *Goto et al.* is based on forming the dual strip portion 53 by growing an AlGaIn layer as represented in Fig. 8(c). (See, also, Col. 9, Ins. 19-27). The growth of the AlGaIn layer results in the filling of the space underneath the overhanging portions as shown in Fig. 6.

The process described in *Sirbu et al.* is a completely different process in which a mesa is formed and respective layers compressed about the mesa, resulting in the gaps referred to by the Examiner. If such an approach were to be used in *Goto et al.*, there would be no reason for forming the overhanging portions upon which the Examiner relies. The gaps in *Sirbu et al.* are a result of the process described therein. If a different process is utilized as in *Goto et al.*, for example, the gaps of *Sirbu et al.* would not result. Similarly, if the process described in *Sirbu et al.* were to be utilized, the overhanging portions would not result.

Thus, it is not a matter of simple combination of the gaps in *Sirbu et al.* and the overhanging portions in *Goto et al.* Each of the features are results of the particular processes described therein. The processes are not interchangeable, and thus the results are also not interchangeable.

Accordingly, applicants respectfully submit that the combination proposed by the Examiner would not have been obvious. Withdrawal of the rejection of claims 1, 12, and the claims that depend therefrom is respectfully requested.

II. CONCLUSION

Accordingly, all claims are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should a petition for an extension of time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional extension is necessary), petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988.

Respectfully submitted,

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